AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A separation device, comprising:

one or more anode reservoirs;

one or more cathode reservoirs;

a plurality of separation channels ~~connected to said anode reservoirs~~, each of said separation channels including a first end connected to the one or more anode reservoirs and a second end connected to the one or more cathode reservoirs, each of said separation channels having an interior bounded by a ~~side wall~~ first side wall opposing a second side wall and a top wall opposing a bottom wall, wherein the first side wall and the second side wall each have a top end and a bottom end, and the top wall abuts the top ends of the first side wall and the second side wall and the bottom wall abuts the bottom ends of the first side wall and the second side wall;

a separation medium filling the plurality of separation channels, the separation medium being a material that effects separation of a sample in the separation medium via application of an electric field across the plurality of separation channels; and

one or more fluid interface ports formed in the ~~side~~ top wall of one of said separation channels to provide access to the interior of the separation channel, each of said fluid interface ports having a depth equal to a thickness of an associated side wall and a diameter that is significantly larger than the depth wherein the separation medium disposed in the interior of the separation channel forms a virtual wall at the fluid interface port ~~having a meniscus that is substantially co-planar with the side wall of the channel in which the virtual wall is formed~~, such that no separation medium enters the fluid interface port; and

wherein the one or more cathode reservoirs is multiplexed with two or more of said separation channels,

wherein a sample to be separated is directly injected into the separation medium filling the plurality of separation channels through one or more of the virtual walls, and

wherein the device is free of sample reservoirs and free of channels providing samples to the plurality of separation channels.

2. (Original) The device of claim 1, further comprising an electrode array coupleable to said reservoirs and said fluid interface ports.

3. (Original) The device of claim 1, wherein the device has an outer perimeter and a center and the separation channels connect the outer perimeter to the center.

4. (Canceled)

5. (Original) The device of claim 1, wherein the fluid interface port has zero dead volume.

6. (Original) The device of claim 1, wherein the fluid interface port comprises an array of apertures forming virtual walls.

7. (Original) The device of claim 1, wherein the fluid interface port has a diameter between about 25 μm and about 125 μm.

8. (Original) The separation device of claim 1, wherein the device is a capillary array electrophoresis plate.

9. (Original) The separation device of claim 1, wherein the device comprises an electrochromatographic system.

10. (Original) The separation device of claim 1, wherein the device comprises a pressure-driven chromatographic system.

11. (Original) The separation device of claim 1, wherein the device comprises an isoelectric focusing system.

12. (Currently Amended) A separation device, comprising:

an array of cathode reservoirs;

an array of anode reservoirs;

an array of microfabricated separation channels formed at a surface of a first microfabricated substrate and a corresponding surface of a second substrate bonded to the surface of said first substrate, each of said channels having an interior bounded by ~~a side wall~~

first side wall, a second side wall, a third side wall, and a fourth side wall, a first end connected to the array of cathode reservoirs and a second end connected to the array of anode reservoirs, the first side wall opposing the second side wall and the third side wall opposing the fourth side wall, wherein the first side wall and the second side wall each have a top end and a bottom end, and the third side wall abuts the top ends of the first side wall and the second side wall and the fourth side wall abuts the bottom ends of the first side wall and the second side wall;

a separation medium filling the plurality of separation channels, the separation medium being a material that effects separation of a sample in the separation medium via application of an electric field across the plurality of separation channels; and

an array of fluid interface ports formed in the third side wall[[s]] of said separation channels to provide access to the interiors of the separation channels, each of said fluid interface ports having a depth equal to a thickness of an associated side wall and a diameter that is significantly larger than the depth wherein the separation medium disposed in the interior of the separation channel forms a virtual wall at each of the fluid interface ports in the array~~, each virtual wall having a meniscus that is substantially co-planar with the side wall of the channel in which the virtual wall is formed~~, such that no separation medium enters the fluid interface port; and

~~an array of cathode reservoirs connected to the first end of each of the separation channels; and~~

~~an array of anode reservoirs,~~ wherein at least one anode reservoir is connected to the respective second ends of at least two of the separation channels,

wherein a sample to be separated is directly injected into the separation medium filling the plurality of separation channels through one or more of the virtual walls, and

wherein the device is free of sample reservoirs and free of channels providing samples to the plurality of separation channels.

13. (Original) The separation device of claim 12, wherein the fluid interface port has a diameter between about 25 μm and about 125 μm.

14. (Original) The separation device of claim 12, wherein the first and second substrate are made of glass.

15. (Previously Presented) The separation device of claim 12, wherein the first and second substrate are made of plastic.

16. (Previously Presented) The separation device of claim 12, further comprising an electrode array coupleable to said array of cathode reservoirs and said array of anode reservoirs.

17. (Original) The separation device of claim 16, wherein said electrode array is integral with the two substrates.

18. (Original) The separation device of claim 17, wherein the fluid interface ports are regularly spaced on one of said substrates to receive solutions from a parallel loading device.

19. (Original) The separation device of claim 12, wherein the first substrate includes an array of electrodes aligned with the fluid interface ports, the cathode reservoirs, and the anode reservoirs to make electrical contacts with a plurality of solutions in a combination of the fluid interface ports, the cathode reservoirs, and the anode reservoirs.

20. (Previously Presented) The separation device of claim 12, wherein the separation device has H holes, and wherein H is equal to the number of samples to be simultaneously processed in the separation device plus a number of cathode ports and anode ports.

21. (Original) The separation device of claim 12, wherein the separation device is made of a combination of glass and plastic.

22. (Original) The separation device of claim 12, further comprising an electrode array in electrical contact with the separation device.

23. (Original) The separation device of claim 12, wherein a plurality of fluid interface ports are disposed in one of said separation channels.

24. (Original) The separation device of claim 12, wherein the first substrate includes an array of

electrodes aligned with the fluid interface ports to make electrical contacts with a plurality of solutions in the fluid interface ports.

25. (Canceled)

26. (Original) The separation device of claim 12, wherein the device is a capillary array electrophoresis plate.

27. (Original) The separation device of claim 12, wherein the device comprises an electrochromatographic system.

28. (Original) The separation device of claim 12, wherein the device comprises a pressure-driven chromatographic system.

29. (Original) The separation device of claim 12, wherein the device comprises an isoelectric focusing system.

30. (Currently Amended) A separation device, comprising:

an anode reservoir;

a substrate;

a plurality of separation channels formed in said substrate, each of said separation channels including a first end connected to the anode reservoir; each of said separation channels having an interior bounded by a ~~side wall~~ first side wall opposing a second side wall and a top wall opposing a bottom wall, wherein the first side wall and the second side wall each have a top end and a bottom end, and the top wall abuts the top ends of the first side wall and the second side wall and the bottom wall abuts the bottom ends of the first side wall and the second side wall;

a separation medium filling the plurality of separation channels, the separation medium being a material that effects separation of a sample in the separation medium via application of an electric field across the plurality of separation channels; and

a plurality of fluid interface ports formed in the ~~side~~ top walls of said separation channels to provide access to the interior of the separation channel, each of said fluid interface ports

having a depth equal to a thickness of an associated side wall and a diameter that is significantly larger than the depth, wherein the separation medium disposed in the interior of the separation channel forms a virtual wall at the fluid interface port ~~having a meniscus that is substantially co-planar with the side wall of the channel in which the virtual wall is formed~~, and wherein each separation channel of the plurality of separation channels includes at least one dedicated fluid interface port , such that no separation medium enters the fluid interface port; and

~~an~~ wherein the anode reservoir is multiplexed to two or more of the plurality of separation channels,

wherein a sample to be separated is directly injected into the separation medium filling the plurality of separation channels through one or more of the virtual walls, and

wherein the device is free of sample reservoirs and free of channels providing samples to the plurality of separation channels.

31. (Original) The separation device of claim 30, wherein the fluid interface port has a diameter between about 25 μm and about 125 μm.

32. (Currently Amended) A separation device, comprising:

a cathode reservoir;

a substrate;

a plurality of separation channels formed in said substrate, each of said separation channels including a first end connected to the cathode reservoir; each of said separation channels having an interior bounded by ~~a side wall~~ first side wall opposing a second side wall and a top wall opposing a bottom wall, wherein the first side wall and the second side wall each have a top end and a bottom end, and the top wall abuts the top ends of the first side wall and the second side wall and the bottom wall abuts the bottom ends of the first side wall and the second side wall;

a separation medium filling the plurality of separation channels, the separation medium being a material that effects separation of a sample in the separation medium via application of an electric field across the plurality of separation channels; and

a plurality of fluid interface ports formed in the ~~side~~ top walls of said separation channels to provide access to the interior of the separation channel, each of said fluid interface ports having a depth equal to a thickness of an associated side wall and a diameter that is significantly

larger than the depth wherein the separation medium disposed in the interior of the separation channel forms a virtual wall at the fluid interface port ~~having a meniscus that is substantially co-planar with the side wall of the channel in which the virtual wall is formed~~ and wherein each separation channel of the plurality of separation channels includes at least one dedicated fluid interface port, such that no separation medium enters the fluid interface port; and

~~a~~ wherein the cathode reservoir is multiplexed to two or more of the plurality of separation channels,

wherein a sample to be separated is directly injected into the separation medium filling the plurality of separation channels through one or more of the virtual walls, and

wherein the device is free of sample reservoirs and free of channels providing samples to the plurality of separation channels.

33. (Original) The separation device of claim 32, wherein the fluid interface port has a diameter between about 25 μm and about 125 μm.

34. (Original) The device of claim 32, further comprising an array of electrodes coupled to the substrate.

35. (Original) The device of claim 32, wherein said plurality of fluid interface ports are regularly spaced in said substrate and adapted to engage a parallel loading device.

36. (Original) The device of claim 35, wherein the parallel loading device comprises a multi-headed pipetter.

37. (Original) The separation device of claim 36, wherein the parallel loading device comprises a pin for carrying and introducing the droplet of a liquid sample to the fluid interface port by contacting the virtual wall.

38. (Original) The separation device of claim 32, wherein the separation channels are disposed in a radial pattern on the separation device.

39. (Withdrawn) A method for injecting a liquid sample through a separation device, comprising the steps of:

connecting a cathode reservoir to respective first ends of two or more separation channels;

connecting an anode reservoir to respective second ends of two or more of said separation channels;

forming a droplet from the liquid sample using a droplet generating system;

directing the droplet to a virtual wall formed by a separation medium in a fluid interface port formed in a side wall of a separation channel wherein the fluid interface port has a dead volume of less than about one picoliter, and the virtual wall forms a meniscus that is substantially co-planar with the side wall of the channel in which the virtual wall is formed, a depth equal to a thickness of the side wall and a diameter that is significantly larger than the depth; and

applying a voltage to the fluid interface port to draw the sample into the separation channel.

40. (Withdrawn) A method of forming a separation device for separating a sample into different components, comprising the steps of:

forming a plurality of separation channels in said separation device, each of said separation channels defined by an interior bounded by a side wall;

forming a plurality of fluid interface ports in the side walls of said separation channels to provide access to the interior of the separation channels, wherein each fluid interface port forms a virtual wall when the separation channels are filled with a separation medium and each fluid interface port has a dead volume of less than about one picoliter, a depth equal to a thickness of an associated side wall and a diameter that is significantly larger than the depth, such that each virtual wall has a meniscus that is substantially co-planar with the side wall of the channel in which the virtual wall is formed; and

connecting an anode reservoir to two or more of the plurality of separation channels.

41. (Withdrawn) The method of claim 40, wherein the step of forming a plurality of fluid interface ports comprises removing portions of said side walls to define an aperture having a diameter between about 25 μm and about 125 μm.

42. (Withdrawn) The method of claim 40, wherein the separation channels are disposed in a radial pattern on the separation device.

43. (Withdrawn) A method of forming a separation device for separating a sample into different components, comprising the steps of:

forming a plurality of separation channels in said separation device, each of said separation channels defined by an interior bounded by a side wall;

forming a plurality of fluid interface ports in the side walls of said separation channels to provide access to the interior of the separation channels, wherein each fluid interface port forms a virtual wall when the separation channels are filled with a separation medium and each fluid interface port has a dead volume of less than about one picoliter, a depth equal to a thickness of an associated side wall and a diameter that is significantly larger than the depth, wherein each virtual wall has a meniscus that is substantially co-planar with the side wall of the channel in which the virtual wall is formed; and

connecting a cathode reservoir to two or more of the plurality of separation channels.

44. (Withdrawn) The method of claim 43, wherein the step of forming a plurality of fluid interface ports comprises removing portions of said side walls to define an aperture having a diameter between about 25 μm and about 125 μm

45. (Withdrawn) The method of claim 43, wherein the separation channels are disposed in a radial pattern on the separation device.

46. (Currently Amended) A separation device, comprising:

an anode reservoir;

a cathode reservoir

a separation channel including a first end connected to said anode reservoir and a second end connected to said cathode reservoir, said separation channel having an interior bounded by a ~~side wall~~ first side wall opposing a second side wall and a top wall opposing a bottom wall, wherein the first side wall and the second side wall each have a top end and a bottom end, and

the top wall abuts the top ends of the first side wall and the second side wall and the bottom wall abuts the bottom ends of the first side wall and the second side wall;

a separation medium filling the separation channel, the separation medium being a material that effects separation of a sample in the separation medium via application of an electric field across the separation channel; and

one or more fluid interface ports formed in the ~~side~~ top wall of the separation channel to provide access to the interior of the separation channel, wherein the separation medium disposed in the interior of the separation channel forms a virtual wall at the fluid interface port ~~the virtual wall a meniscus that is substantially co-planar with the side wall of the channel in which the virtual wall is formed~~, such that no separation medium enters the fluid interface port, a depth equal to a thickness of an associated side wall and a diameter that is significantly larger than the depth; and

~~a cathode reservoir connected to the separation channel~~

wherein a sample to be separated is directly injected into the separation medium filling the separation channel through one or more of the virtual walls, and

wherein the device is free of sample reservoirs and free of channels providing samples to the separation channel.

47. (Currently Amended) A separation device, comprising:

a cathode reservoir;

a plurality of separation channels, each separation channel having an end connected to the cathode reservoir, each separation channel having an interior bounded by a ~~side wall~~ first side wall opposing a second side wall and a top wall opposing a bottom wall, wherein the first side wall and the second side wall each have a top end and a bottom end, and the top wall abuts the top ends of the first side wall and the second side wall and the bottom wall abuts the bottom ends of the first side wall and the second side wall;

a separation medium filling the separation channels, the separation medium being a material that effects separation of a sample in the separation medium via application of an electric field across the plurality of separation channels; and

one or more fluid interface ports formed in a ~~side~~ top wall of at least one of said separation channels to provide access to the interior of the separation channel, wherein the separation medium disposed in the interior of the separation channel forms a virtual wall at the

fluid interface port ~~having a meniscus that is substantially co-planar with the side wall of the channel in which the virtual wall is formed~~, such that no separation medium enters the fluid interface port , a depth equal to a thickness of an associated side wall and a diameter that is significantly larger than the depth; and

~~a~~ wherein the cathode reservoir is multiplexed with the separation channels,

wherein a sample to be separated is directly injected into the separation medium filling the plurality of separation channels through one or more of the virtual walls, and

wherein the device is free of sample reservoirs and free of channels providing samples to the plurality of separation channels.

48. (Currently Amended) A separation device, comprising:

an anode reservoir;

a separation channel including an end connected to said anode reservoir, said separation channel having an interior bounded by a ~~side wall~~ first side wall opposing a second side wall and a top wall opposing a bottom wall, wherein the first side wall and the second side wall each have a top end and a bottom end, and the top wall abuts the top ends of the first side wall and the second side wall and the bottom wall abuts the bottom ends of the first side wall and the second side wall;

a separation medium filling the separation channel, the separation medium being a material that effects separation of a sample in the separation medium via application of an electric field across the separation channel; and

one or more fluid interface ports formed in the ~~side~~ top wall of said separation channel to provide access to the interior of the separation channel, wherein the separation medium disposed in the interior of the separation channel forms a virtual wall at the fluid interface port ~~having a meniscus that is substantially co-planar with the side wall of the channel in which the virtual wall is formed~~, such that no separation medium enters the fluid interface port, a depth equal to a thickness of an associated side wall and a diameter that is significantly larger than the depth; and

wherein a sample to be separated is directly injected into the separation medium filling the separation channel through one or more of the virtual walls, and

wherein the device is free of sample reservoirs and free of channels providing samples to the separation channel.

49-50. (Canceled)

51. (Previously Presented) The separation device of claim 1, further comprising a droplet generating system, the droplet generating system including a pin corresponding to each fluid interface port for forming and directing a droplet of a sample to the corresponding fluid interface port.